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Docket No. 6653.36022

PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In Re Patent Application Of	:	
Frank Jay Hague et al.	:	Examiner: Abbott, Yvonne
Serial No. 10/731,257	:	
Filing Date: December 9, 2003	:	Group Art Unit: 3644
"BLEACHED EXPANDED PIGSKIN: AND PRODUCTS"	:	

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SUBMISSION OF PRIORITY DOCUMENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In order to perfect Applicant's claim to priority, please find enclosed the following items:

1) a certified copy of Chinese patent application number 02157720.8 filed December 20, 2002;

2) an accurate English translation of the same.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop ISSUE FEE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on **OCTOBER 20, 2004**.

Geoffrey A. Mantooth, Reg. No. 32,042

This completes the requirements for claiming priority. It is respectfully submitted that the claim for priority be accepted.

If any additional fees are required, please charge our deposit account number 23-2770.

Respectfully submitted,

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6653.36022/230402

证　明

本证明之附件是向本局提交的下列专利申请副本

申　　日：　2002 12 20

申　　号：　02 1 57220.8

申　　类　别：　发明

发明创　　称：　猪皮漂白发泡工艺及其直接得到的制品

申　　人：　周青标

发明人（设计人）：周青标

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中华人民共和国
国家知识产权局局长　王景川

2003 年 12 月 3 日

权 利 要 求 书

1、一种猪皮漂白发泡工艺，其特征是：取含水量在 50-80%（重量比）的猪皮进行碱处理，由碱性溶液及碱性酶与石灰调成糊状，PH 值≥12，涂抹在猪皮上，处理至可溶性胶原蛋白溶解，采用氯化铵或硫酸铵溶液进行脱碱，水洗，进而采用氯化铵或硫酸铵溶液与胰酶混合液进行二次脱碱酶软，脱脂，水洗，进一步采用双氧水或高锰酸钾漂白得到成品。

2、按照权利要求 1 所述的猪皮漂白发泡工艺，其特征在于：碱处理中的碱性溶液为 10-30%（重量比）浓度的无铁硫化钠与石灰及 0.01-0.05%（与皮重量比）的碱性酶调成糊状，涂抹在猪皮上经 10-30 小时处理。

3、按照权利要求 1 或 2 所述的猪皮漂白发泡工艺，其特征在于：一次脱碱溶液含 1-2.5%（与皮重量比）的氯化铵，脱碱时间在 0.5-3 小时。

4、按照权利要求 1 或 2 所述的猪皮漂白发泡工艺，其特征在于：二次脱碱酶软溶液中采用 4-8%（与皮重量比）的氯化铵与 25 倍胰酶 0.1-0.5%（与皮重量比），脱碱酶软时间为 3-8 小时。

5、按照权利要求 3 所述的猪皮漂白发泡工艺，其特征在于：第二次脱碱酶软溶液中采用 4-8%（与皮重量比）的氯化铵与 25 胰酶 0.1-0.5（与皮重量比），脱碱酶软时间为 3-8 小时。

6、按照权利要求 1 或 2 或 5 所述的猪皮漂白发泡工艺，其特征在于：漂白程序中采用 15-30%（重量比）浓度的双氧水经 0.5-5 小时漂白处理。

7、按照权利要求 3 所述的猪皮漂白发泡工艺，其特征在于：漂白程序中采用 15-30%（重量比）浓度的双氧水经 0.5-5 小时漂白处理。

8、按照权利要求 4 所述的猪皮漂白发泡工艺，其特征在于：漂白程序中采用 15-30%（重量比）浓度的双氧水经 0.5-5 小时漂白处理。

9、一种按照权利要求 1 所述的猪皮漂白发泡工艺直接得到的制品，其特征为发泡形白色弹性软体。

说　明　书

猪皮漂白发泡工艺及其直接得到的制品

技术领域：本发明关于一种猪皮漂白发泡工艺其制品，其制品主要用于制成宠物用品。

背景技术：猪皮主要用于制革用品，由此产生的很多边角料、下脚料一般用于制成胶原蛋等低附加值的产品，而将猪皮制成本发明应用领域的宠物用品主要是将成皮压制或卷制成仿骨头用品。从未见报导对猪皮进行发泡漂白制成宠物用品，而有较高附加值的畜皮发泡宠物用品均由牛皮经双氧水等漂白后简单制成。存在发泡程度低、成本也较高等缺点。

发明内容：本发明的目的是要进一步开发利用猪皮，特别是对制革猪皮的下脚料对其进行漂白发泡处理，以期达到深开发利用增加附加值效果。

本发明的漂白发泡工艺特点是：取含水量在 50-80%（重量比）的猪皮进行碱处理，由碱性溶液及碱性酶与石灰调成糊状，PH 值≥12，涂抹在猪皮上，处理至可溶性胶原蛋白溶解，采用氯化铵或硫酸铵溶液进行脱碱，水洗，进而采用氯化铵或硫酸铵溶液与胰酶混合液进行二次脱碱酶软，脱脂，水洗，进一步采用双氧水或高锰酸钾漂白得到成品。

本发明工艺中对猪皮的碱处理工艺中碱处理步骤所指的碱性溶液可以是烧碱等，最理想的是硫化钠，特别是指无铁硫化钠，此时硫化钠溶液的浓度为 10-40%（重量比）与石灰及 0.01-0.05%（与皮重量比）的碱性酶调成糊状，涂抹在猪皮上经 10-30 小时碱化处理能达到将猪皮的可溶性胶原蛋白全部溶解。另第一步的脱碱溶解取氯化铵较佳，能避免可能存在的硫酸钙沉淀污染发泡猪皮，此时氯化铵的溶液的氯化铵含量为皮重量的 1-2.5%，脱碱时间在 0.5-3 小时。进而在第二次脱碱中也采用氯化铵为佳，第二次脱碱酶软溶液中含 4-8%（与皮重量比）的氯化铵与 25 倍胰酶 0.1-0.5%（与皮重量比），脱碱酶软时间为 3-8 小时。上述碱处理及第一、二次脱碱的时间掌握一般与调配的药物浓度、数量、气温及转鼓搅拌等的因素有关，这些时

间的掌握是指一般情况下如此处理。实际上的延长与缩短时间可以调配掌握，例如第一次与第二次的脱碱时间，即使是有意延长或缩短时间仅仅对直接到的产品的质量稍有影响而不影响工艺本身。工艺直接得到的制品其特点是发泡形白色软弹性体。

本发明工艺独特，特别是用在猪皮处理上具有简约、可操作性强之特点。直接得到的制品为外观漂亮，仍具有猪皮本身的胶原纤维等特性为宠物所喜爱，具有较高的附加经济价值。

具体实施方式:

例 1: 原料取制革二、三、四层碱皮，一般含水量在 50-80%（重量比），经碱处理→水洗→一次脱碱→水洗→二次脱碱酶软→脱酯→水洗→漂白（发泡）→压水→截片→烘干→成品。其中，碱处理用 10-30%（重量比）浓度无铁硫化钠溶液加碱性酶 0.01-0.05%（与皮重量比）加石灰，石灰用量是使其调节成糊状并调制相应的 PH 值大于 12 为准，均匀涂抹在每张碱皮上，碱化处理时间在 10-30 小时之间为佳；一次脱碱实施例中也采用氯化铵溶液，氯化铵重量占 1-2.5%（与皮重量比）处理时间 0.5-3 小时为佳；二次脱碱酶软采用氯化铵 4-10%（与皮重量比）和胰酶（以 25 倍胰酶为基数计算）0.1-0.5%（与皮重量比）；混合的脱碱酶软液，处理时间为 4-6 小时较佳；脱脂流程中一般采用碳酸钠与市售脱脂剂混合脱脂效果较好，取含碳酸钠 1-3%（与皮重量比）和 0.3-1%（与皮重量比）的脱脂剂混合液脱脂；漂白流程中选用双氧水为佳，双氧水的用量为皮重的 15-30%为佳，漂白时间 0.5-5 小时。

例 2: 取二、三、四层制革下脚料碱皮，含水量为 60%（重量比），由含 60%的无铁硫化钠（Na_2S）1 公斤加碱性酶 300 克，加清水 1.5 公斤，加石灰 3 公斤搅拌成糊状，均匀涂抹在约 1000 公斤猪皮上，经 20 小时碱化处理后，用清水冲洗 1-3 小时，在含氯化铵 20 公斤的溶液中进行第一次脱碱处理，时间 1 小时，再清水冲洗后，再加由 80 公斤与 1 公斤胰酶混合而成的第二次脱碱酶软溶液中，转、停鼓（装猪皮的容器）约 5 小时，而后用碳酸钠 25 公斤及脱脂精 5 公斤脱脂水洗约 2 小时，清水冲洗然后加 240 公斤的双氧水转停鼓 2 小时再封鼓过夜，取出经发泡漂白的猪皮制品压水、裁片、烘干得制成品为白色弹性软体。

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CERTIFICATION

Document translated: People's Republic of China Patent Application No. 02157220.8

This is to certify that the above-stated document was translated by Dr. Tracy Yeo from Chinese into English, and that it represents an accurate and faithful rendition of the original text to the best of my knowledge and belief.

By: 

Date: Aug 31, 2004

Tracy Yeo, who is a native speaker of of Chinese and English, holds a PhD in Biomedical Sciences from the City University of New York as well as a B.S. in Agricultural Chemistry from National Taiwan University. Dr. Yeo has worked as a translator for ten years.

Certificate

The appendix of this certificate is a duplicate copy of the following patent application that has been submitted to this office.

Date of Application: December 20, 2002
Application Number: 02 1 57220.8

Type of Application: Invention

Title of Invention: Process for Bleaching and Expanding Pigskin and Direct Product Thereof

Name of Applicant: ZHOU, Qingbiao

Name of Inventor / [*illegible under the ribbon*]: ZHOU, Qingbiao

People's Republic of China
Commissioner, State Intellectual Property Office

WANG, Jingchuan (Signature)

December 3, 2003

State Intellectual Property Office of the People's Republic of China

Zip code: 325005 A No. 6, Jiu Shan He Tong Qiao, Wen Zhou City, Zhe Jiang Province WU, Jidao Application Number: 02157220.8	Issue Date: December 24, 2002

Notification of Receipt of Patent Application

According to the provisions of Article 28 of the Patent Law of the People's Republic of China, and Rules 39, 40 of the Implementing Regulations of the Patent Law, the State Intellectual Property Office has received the patent application submitted by the applicant for processing. The assigned application number and filing date are notified as follows:

Application Number: **02157220.8**

Filing Date: **December 20, 2002**

Name of Applicant: **ZHOU, Qingbiao**

Title of Invention: **Process for Bleaching and Expanding Pigskin and Direct Product Thereof**

It has been verified and affirmed that the State Intellectual Property Office has received the following documents:

Request	Number of pages for each set: 2	Number of sets: 2
Abstract	Number of pages for each set: 1	Number of sets: 2
Claims	Number of pages for each set: 1	Number of sets: 2
Description	Number of pages for each set: 2	Number of sets: 2

Request for Fee Reduction
Statement of Early Disclosure
Request for Substantive Examination

Brief Notes:

1. According to Article 28 of the Patent Law, if the application is sent by mail, the date of mailing indicated by the postmark shall be the date of filing. If the applicant finds that the above-mentioned filing date is inconsistent with the mailing date of the application material, he/she can submit a Statement of Opinion and the stub of a registered mail receipt to the State Intellectual Property Office within 2 months of receipt of this notice to request the office to perform formalities for correction of the filing date.
2. The application number is a code that is assigned by the State Intellectual Property Office to each patent application received for processing, and it is the most effective identification means for the application. When the applicant goes through formalities at this office, he/she shall accurately and clearly provide the application number.
3. Documents or monetary remittances that are sent to individual examiners have no legal effect.
4. Intermediate documents, divisional applications, and request for domestic priority shall be mailed directly to the Receiving Department of the State Intellectual Property Office.

State Intellectual Property Office of the People's Republic of China
[*seal*]

[*illegible footnote*]

Claims

1. A process for bleaching and expanding pigskin, characterized by providing pigskin having a water content of between 50 – 80% (by weight) for alkaline processing, mixing an alkaline solution and an alkaline enzyme with lime to form a paste with a pH ≥ 12, rubbing onto the pigskin, continuing until the soluble collagen is solubilized, de-alkalinizing using ammonium chloride or ammonium sulfate solution, rinsing with water, followed by using a solution comprising an ammonium chloride or ammonium sulfate solution mixed with pancreatin to perform secondary dealkalization/enzymatic softening, degreasing, rinsing with water, and further bleaching with hydrogen peroxide solution or potassium permanganate to obtain a product.
2. A process for bleaching and expanding pigskin according to claim 1, characterized in that the alkaline solution used in the alkaline processing comprises a concentration of 10 – 30% (by weight) of iron-free sodium sulfide, lime and 0.01 – 0.05% (by weight with respect to the skin) of alkaline enzyme that are mixed into a paste, rubbed onto the pigskin and processed for 10 – 30 hours.
3. A process for bleaching and expanding pigskin according to claim 1 or 2, characterized in that the primary dealkalization solution contains 1 – 2.5% (by weight with respect to the skin) of ammonium chloride, and the time period for the dealkalization process is 0.5 – 3 hours.
4. A process for bleaching and expanding pigskin according to claim 1 or 2, characterized in that 4 – 8% (by weight with respect to the skin) of ammonium chloride and 0.1 – 0.5% (by weight with respect to the skin) of 25 times pancreatin are used in the secondary dealkalization/enzymatic softening solution and the time period for the dealkalization/enzymatic softening process is 3 – 8 hours.
5. A process for bleaching and expanding pigskin according to claim 3, characterized in that 4 – 8% (by weight with respect to the skin) of ammonium chloride and 0.1 – 0.5% (by weight with respect to the skin) of 25 times pancreatin are used in the secondary dealkalization/enzymatic softening solution and the time period for the dealkalization/enzymatic softening process is 3 – 8 hours.
6. A process for bleaching and expanding pigskin according to claim 1 or 2 or 5, characterized in that a concentration of 15 – 30% (by weight) of hydrogen peroxide is used in the bleaching process and the bleaching process is performed for 0.5 – 5 hours.
7. A process for bleaching and expanding pigskin according to claim 3, characterized in that a concentration of 15 – 30% (by weight) of hydrogen peroxide is used in the bleaching process and the bleaching process is performed for 0.5 – 5 hours.
8. A process for bleaching and expanding pigskin according to claim 4, characterized in that a concentration of 15 – 30% (by weight) of hydrogen peroxide is used in the bleaching process and the bleaching process is performed for 0.5 – 5 hours.
9. A direct product obtained according to the process for bleaching and expanding pigskin according to claim 1, characterized in that it is a soft white expanded elastic material.

Description

Process for Bleaching and Expanding Pigskin and Direct Product Thereof

Field of the Invention: This invention relates to a process for bleaching and expanding pigskin and to products thereof, which are primarily used to manufacture articles for pet use.

Technical Background: Pigskin is primarily used to manufacture leather articles. A variety of leftover materials and resulting tailings are generally used to manufacture products of lower added values, such as collagen. The process of using pigskins to manufacture articles for pet use, which is the field of this invention, primarily involves pressing or rolling skins to produce imitation bone products. Bleaching and expanding pigskins to produce articles for pet use has not been reported, and expanded hide articles for pet use having higher added values are generally made from cow hide, processed simply by bleaching with agents such as hydrogen peroxide. This has the disadvantages of a low degree of expansion and higher costs.

Disclosure of the Invention: An object of this invention is to further develop the usage of pigskin, and particularly to bleach and expand tailings from pigskin used for leather production, in order to further develop the usefulness thereof and to increase added values.

The characteristics of the process of bleaching and expanding are: providing pigskin having a water content of between 50 – 80% (by weight) for alkaline processing, mixing an alkaline solution and an alkaline enzyme with lime to form a paste with a pH $\geq$ 12, rubbing onto the pigskin, continuing until soluble collagen is solubilized, de-alkalinizing using an ammonium chloride or ammonium sulfate solution, rinsing with water, followed by using a solution comprising an ammonium chloride or ammonium sulfate solution mixed with pancreatin to perform secondary dealkalization/enzymatic softening, degreasing, rinsing with water, and further bleaching with hydrogen peroxide solution or potassium permanganate to obtain a product.

The alkaline solution referred to in the alkaline processing in accordance with the process of alkaline processing pigskin of this invention can be caustic soda, preferably sodium sulfide, and particularly iron-free sodium sulfide. At this time the concentration of the sodium sulfide solution is 10 – 40% (by weight); this is mixed with lime and 0.01 – 0.05% (by weight with respect to the skin) of alkaline enzyme to form a paste, and rubbed onto the pigskin; after 10 – 30 hours of alkaline processing, complete solubilization of soluble collagen of the pigskin can be achieved. Furthermore, it is preferable that ammonium chloride be used for the primary de-alkaline solubilization process, as it can prevent calcium sulfate that may be present from contaminating the expanding pigskin; at this time the ammonium chloride content of the ammonium chloride solution is 1 – 2.5% of the skin weight, and the time period for dealkalization is 0.5 – 3 hours. Furthermore, it is also preferable that ammonium chloride be used in the secondary dealkalization. The secondary dealkalization/enzymatic softening solution contains 4 – 8% (by weight with respect to the skin) of ammonium chloride and 0.1 – 0.5% of 25 times pancreatin (by weight with respect to the skin), and the time period for dealkalization/enzymatic softening is 3 – 8 hours. Time periods for the aforementioned alkaline processing and the primary and secondary dealkalization processes are determined in light of factors such as chemical concentrations in the mixture, quantities, temperatures,

and agitation by a rotating drum. The time periods indicated are those used under general conditions; lengthening or shortening of these time periods can be determined by practical application; and if, for example, the time periods for the primary and secondary dealkalization processes are intentionally lengthened or shortened, this will only affect the quality of the direct product and will not affect the process *per se*. Products directly obtained from this process are characterized as soft white expanded elastic materials.

The process of this invention is unique, especially when applied to pigskin processing, and is characterized by being rapid, cost-effective, and having good work characteristics. The direct product has a pleasing appearance while maintaining collagenous fiber characteristics; it is desirable by pets and has a high added value.

Description of Embodiments:

Example 1: The second, third, and/or fourth layers of alkaline skins used for leather production are selected as the raw material, generally having a water content of 50 – 80% (by weight), and these undergo alkaline processing -> water rinse -> primary dealkalization -> water rinse -> secondary dealkalization/enzymatic softening -> degreasing -> water rinse -> bleaching (expanding) -> pressing out water -> cutting into pieces -> drying -> product. Herein, a 10 – 30% (by weight) concentration of iron-free sodium sulfide plus 0.01 – 0.05% (by weight with respect to the skin) of alkaline enzyme and lime are used in the alkaline processing; the quantity of lime used is determined so that the mixture becomes a paste and the corresponding pH value is greater than 12; this is rubbed uniformly onto each sheet of alkaline skin; the time period for alkaline processing is preferably 10 – 30 hours; in an example of the primary dealkalization, an ammonium chloride solution is used and preferably an ammonium chloride content of 1 – 2.5% (by weight with respect to the skin) is used with a processing time of 0.5 – 3 hours; in the secondary dealkalization/enzymatic softening, it is preferable to use a mixed dealkalization/enzymatic softening solution of 4 – 10% ammonium chloride (by weight with respect to the skin) and 0.1 – 0.5% pancreatin (calculated based on 25 times pancreatin) (by weight with respect to the skin) with processing time of 4 – 6 hours. In general, mixtures of sodium carbonate and commercially available degreasing agent have a superior degreasing effect in the degreasing process. Sodium carbonate in the amount of 1 – 3% (by weight with respect to the skin) mixed with 0.3 – 1% (by weight with respect to the skin) of degreasing agent is used for degreasing. For the bleaching process, it is preferable to use a hydrogen peroxide solution at 15 – 30% of skin weight, and a bleaching time of 0.5 – 5 hours.

Example 2: The second, third, and/or fourth layer of alkaline skins of the tailings from material used for leather production are selected, having a water content of 60% (by weight); 1 Kg of 60% iron-free sodium sulfide (Na_2S) is used, 300g of alkaline enzyme is added, 1.5 Kg of clean water is added, 3 Kg of lime is added and mixed into a paste, which is uniformly rubbed onto approximately 1000 Kg of pigskin; after 20 hours of alkaline processing, this is rinsed with water for 1 – 3 hours, then the primary dealkalization process is performed in a solution containing 20 Kg of ammonium chloride for one hour; after rinsing with water, this is added to 80 Kg of the secondary dealkalization/enzymatic softening solution into which 1 Kg pancreatin is mixed; a drum (the container that contains the pigskin) is spun and stopped for about 5 hours; then washing is performed with a degreasing solution containing 25 Kg sodium carbonate and 5 Kg degreasing agent for approximately 2 hours; this is rinsed with water, then 240 Kg of hydrogen peroxide are added; the drum is spun and stopped for 2 hours; then the drum is sealed overnight; the expanded and bleached pigskin product is removed, the water is pressed out; and this is cut into pieces and dried to obtain a soft white elastic product.